importance of his taking charge of the whole camp and giving all the necessary orders for conducting the operations during the general rehearsals and the eclipse itself. He eventually agreed to this, and the procedure and time signals were arranged between us. To me, an old eclipser, it was a beautiful thing shortly afterwards to see the splendid drill commenced in eclipse form, along all lines, going on to the sound of the bugle.

It was found that with such a large number of volunteers we could practically undertake almost every kind of work which had ever been attempted during an eclipse. The observers were divided into twenty-two groups, each in charge of a responsible person.

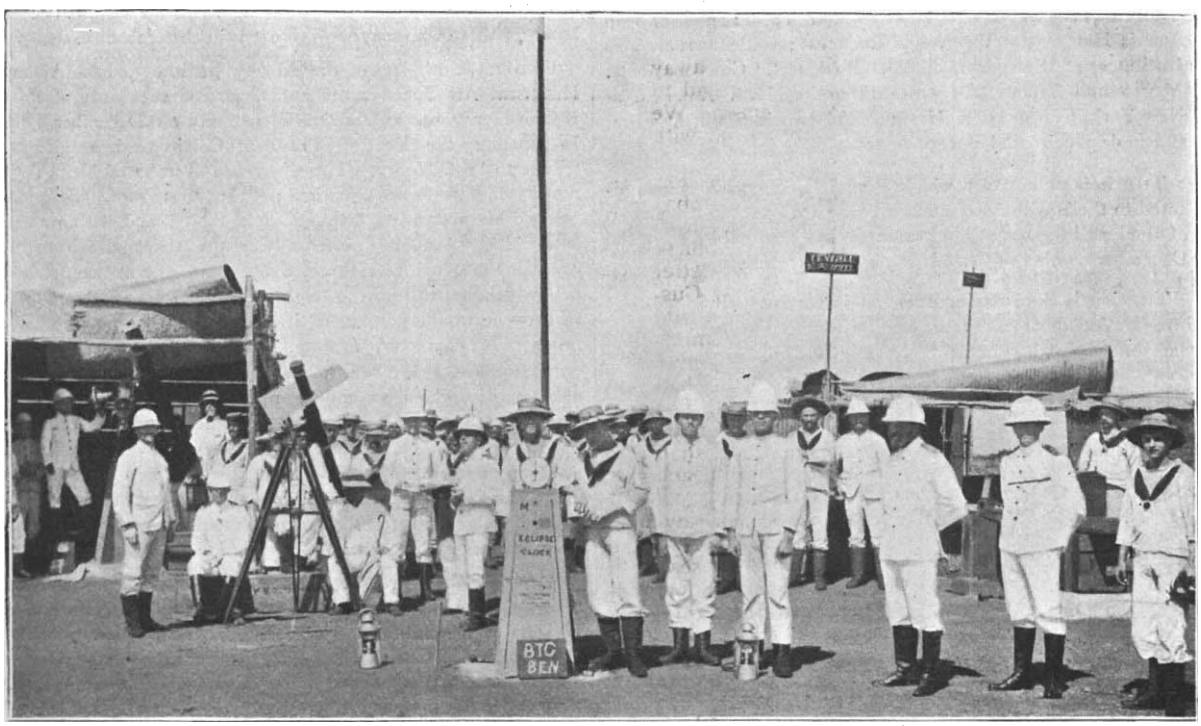


FIG. 3.—Preparing for a rehearsal. Captain Chisholm-Batten and time-party at the eclipse clock.

The groups of observers were as follows :—

(1) Time.
(2) 6-inch prismatic camera.
(3) 9-inch ,, ,,
(4) Integrating spectroscope.
(5) 6-inch equatorial.
(6) Coronagraph.
(7) Discs.
(8) Sketches of corona without discs.
(9) 3¾-inch equatorial.
(10) Observations on stars.
(11) Shadow-bands.
(12) Meteorological observations.
(13) Hand spectroscopes.
(14) Prisms for rings.
(15) Polariscope.
(16) Landscape colours.
(17) ,, cameras.
(18) Shadow phenomena.
(19) Kinematograph for eclipse.
(20) Kinematograph for shadow.
(21) Contact observations.
(22) Observations on natives, animals, &c.

NORMAN LOCKYER.

(*To be continued.*)

NOTES.

THE list of "New Year's Honours" includes the following names of men distinguished by their scientific attainments :—The dignity of a peerage has been conferred upon Sir John Lubbock, Bart. Dr. Lauder Brunton has received the honour of knighthood. Captain Abney has been promoted to a Knight Commandership (K.C.B.) of the Order of the Bath, and Major-General Festing has been created a Companion of the same Order (C.B.). Dr. Patric Manson, medical adviser to the Colonial Office, has been appointed a Companion of the Order of St. Michael and St. George (C.M.G.).

A WELL-ATTENDED meeting of the members of the Palæontographical and Ray Societies was held at the Geological Society's Apartments, Burlington House, on Tuesday, December 19; the Rt. Hon. Sir John Lubbock, Bart., M.P., President of the Ray Society, in the chair. The object of the joint meeting was to present to the Rev. Prof. Wiltshire, the hon. sec. of both the above-named societies, his portrait in oils, an illuminated address, and a cheque for 138*l.*—the balance of the sum subscribed after defraying expenses—in recognition of the services rendered by him to these societies and to palæontology and zoology during a period of more than thirty years. The portrait was executed by Miss Atkinson; the illuminated address by Miss G. M. Woodward. Among those present were Dr. Henry Woodward, F.R.S., President of the Palæontographical Society, the Rt. Rev. Bishop Mitchinson, Master of Pembroke, Oxford, Prof. T. McKenny Hughes, F.R.S., and Prof. W. J. Lewis, the Rev. R. A. Bullen, the Rev. G. F. Whidborne, V.P. Pal. Soc, the Rev. H. H. Winwood, Dr. W. T. Blanford, F.R.S., Mr. John Hopkinson, Prof. T. Rupert Jones, F.R.S., Sir Owen Roberts, Dr. D. H. Scott, F.R.S., Mr. F. W. Rudler, F.G.S., and Mr. A. Strahan; many ladies were also present. The presentation address was made by Sir John Lubbock, and the Rev. Prof. Wiltshire responded. Speeches were also made by Dr. Woodward, Prof. T. McKenny Hughes, Rev. G. F. Whidborne, and the Rev. H. H. Winwood; 132 subscribers took part in the testimonial.

A CONGRÈS d'Histoire des Sciences will be held in connection with the Paris Exhibition. As the development of all branches of scientific knowledge will be considered, the Congress will be of wide interest. Prof. Paul Tannery is the president of the

organising committee, and Dr. Sicard de Plauzoles is the secretary. The official address is 10 boulevard Raspail, Paris.

PROF. MILNE-EDWARDS has been elected vice-president of the Paris Academy of Sciences for this year.

THE eighth Pasteur Institute existing in France was opened at Lyons on Monday, the seven others, in order of seniority, being Paris, Algiers, Tunis, Montpellier, Marseilles, Bordeaux and Lille. In connection with this, the *Times* points out that there are six Institutes in Russia, at St. Petersburg, Moscow, Samara, Kharkof, Warsaw and Odessa; five in Italy, at Bologna, Milan, Naples, Palermo and Turin; and two in Austria-Hungary, at Vienna and Budapest; while there are also Institutes at Saragossa, Malta, Bukharest, Constantinople, Aleppo and Tiflis. There are three in North America, at New York, Chicago and Havana, and two in South America, at Rio de Janeiro and Buenos Ayres.

THE important paper which Prof. J. J. Thomson communicated to the British Association meeting at Dover, on the masses of the ions in gases at low pressures, has been published in the December number of the *Philosophical Magazine*.

THE ion is now playing such an important part in physical investigations that many are anxious to become familiar with the work which has brought electrolysis to its present standpoint. An interesting article on electrolysis and the theory of ions has been communicated to *La Revue des deux Mondes* by M. A. Dastre, in which our readers will find the history of the subject fully stated.

WE regret to see the announcement that Sir James Paget, Bart., F.R.S., died on Saturday last, at the age of eighty-five.

THE *Times* states that the Paris Observatory will henceforth in all its publications reckon the day from midnight to midnight, the hours being numbered from 0 to 24. This system of time reckoning has been adopted in our *Nautical Almanac* since 1891.

WE learn from *Science* that Dr. G. A. Dorsey, curator of anthropology, Field Columbian Museum, accompanied by an assistant and the Rev. H. R. Voth, have gone to the Pueblo of Oraibi, Arizona. The object of the expedition is to secure additional ethnological material for the Museum, to witness the winter solstice ceremony just past in order to get suggestions for new groups, and also to start a systematic and somewhat extended excavation in order to strengthen the archæological exhibit from this interesting region. The expenses are covered by Mr. Stanley R. McCormick, of Chicago, who has placed 5000 dollars at the disposal of the Museum in addition to the 10,000 dollars already expended on the Hopis.

THE *Daily Chronicle* recalls that a London paper of the first week of 1800 alluded to the then recent hot disputes in France and England respecting the beginning of the nineteenth century. According to the paragraph, the famous Joseph Jérôme Lefrancais de Lalande, who then occupied the Chair of Astronomy in the University of Paris, had taken an active part in the controversy, and he had pronounced in favour of January 1, 1801. His decision had been generally accepted as correct on both sides of the Channel. The newspaper referred to remarks: "The same ridiculous question was agitated in 1700." So does history repeat itself.

AT the last meeting of the British Astronomical Association, Mr. Maunder made a statement with reference to the arrangements that are being made by the Association for the proposed expedition to Spain and Algeria to view the solar eclipse of May 28. Subject to a sufficient number of passages being actually taken before January 31, the Royal Mail steamer *Tagus*, or a sister vessel, will be engaged, and will start from Southampton on Friday, May 18, at 6 p.m., calling at Cadiz and Alicante, and arriving at Algiers at 6 a.m. on Thursday, the 24th. The vessel will stay there until after the eclipse, leaving at 6 a.m. on Tuesday the 29th, and calling at Alicante, Gibraltar, and Lisbon on the way to Southampton, which will be reached at 7 a.m. on Monday, June 4. It is hoped the members of the Association would divide themselves into three groups—those observing the eclipse (1) in the interior of Spain; (2) at Alicante or neighbourhood, and (3) in Algeria, where the ship will act as hotel for those who may wish to use it in that capacity.

UNDER the auspices of the Albany Institute and the Albany Historical Art Society, the anniversary of the birth of Prof. Joseph Henry was celebrated in that city on December 17th. In opening the meeting President Colvin paid a glowing tribute to Prof. Henry. The *Electrical Review* of New York reports him to have remarked:—"In 1831 Prof. Henry developed his system of magnetic telegraphy, and within these halls (Albany Academy) placed a telegraph wire a mile in length, over which signals were sounded by the self-same magnet and bell which you will hear to-night. The telegraph was now a reality—he would not patent it. Thus here began a greater phase of his character, his unselfishness and his devotion to the public welfare. We are now brought face to face with that noble nature, which as college professor, as director and developer of Smithson's magnificent bequest to the American people, as counsellor of the United States Government in its most important scientific and technical works, as a discoverer in many branches of science, made him great among our greatest—faithful, noble and true." An illustrated account of Henry's work appears in the *Scientific American* of December 23.

PROF. S. W. STRATTON, of the University of Chicago, has recently been appointed Inspector of Standards, Bureau of Weights and Measures. In accepting this position (remarks *Science*) Prof. Stratton takes immediate charge of the United States Office of Weights and Measures at a most opportune time. This Office has long had in its custody the national standards of length and mass, and has done much valuable work for science and the arts, which has been the logical outcome of this custody. Within the last two years the Office has taken up vigorously the matter of standards for electrical measurements, has acquired apparatus and made special studies, and is now ready to do valuable work along that line. It is especially well equipped for measurements of resistance of the highest degree of accuracy.

THE thirty-first volume of the *Zeitschrift für physikalische Chemie* just issued forms a pleasing novelty in scientific publication. This Jubelband, which is published as a whole and not in parts as usual, is dedicated by his pupils to Prof. J. H. van 't Hoff, to celebrate the twenty-fifth anniversary of his taking the degree of Doctor of Philosophy at the University of Utrecht. The introduction to the volume, by Prof. Ostwald, consists of a short biography of the distinguished Dutch Professor, and an appreciative *résumé* of his far-reaching discoveries, together with a complete list, compiled by Dr. E. Cohen, of his published researches. The authors of all the papers are old students of Prof. van 't Hoff, and each paper is written in the author's own language, with the exception of the Polish and Swedish contributors, so that German, English, French and Dutch are represented. As there are twenty-six papers in all, it is hardly possible to give a summary of them here, but the diversity of the subjects treated serves to show the many-sided originality of the author of the modern theory of solution. An excellent portrait of Prof. van 't Hoff in heliogravure is included in the volume.

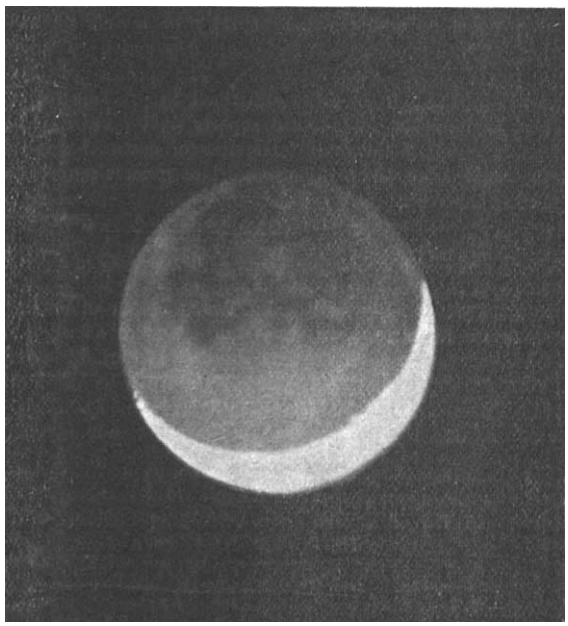
DR. ROBERT WALLACE has republished as a separate leaflet his letter to the *Times* of November 29, on the African horse-sickness. The disease is a malarial fever produced by a minute fungus which grows during the summer on the *veldt*, but whether in water, on the soil, or as a parasite, is not yet ascertained. Although not contagious, it is contracted by animals exposed to the night air, especially in damp situations. The disease appears annually, but only in certain seasons attains alarming proportions. Its serious character may be gleaned from the statement that some 95 per cent. of the animals afflicted succumb. And unfortunately no effectual system of inoculation has yet been discovered to check its ravages. Certain precautions are, however, mentioned, which render horses less likely to be attacked; and we believe that horses fed on dry fodder, like those of the British cavalry, stand a better chance of escape than grass-fed animals.

AT a recent meeting of the Society of Arts, Mr. F. G. Aflalo read a paper on the necessity for legislative regulation of sea-angling. It was urged that angling from piers on the British coast resulted in a very appreciable diminution of the numbers of certain species of fishes, such spots being favourite feeding-grounds for fish of several descriptions. It was not that each boy that fished did much harm by himself, but the total catch by the entire army of boy-fishers must be very large indeed. And there is one very strong reason why legislation in regard to restoring under-sized fish to the sea should be enforced against the angler rather than against the steam-trawler. This is that while most of such fish are irretrievably injured by the trawler, the majority of those captured by the hook, if carefully removed, are little or none the worse for their temporary sojourn in the air. It is admitted that a large destruction of small fish takes place through trawling; but the only remedy for this would be to stop the industry altogether. On the other hand, the return of small fish captured by the hook to the water is a comparatively easy matter to enforce. The general sense of the meeting supported the author's views.

THE greater portion of the December issue of the *Zoologist* is taken up by the continuation of Mr. Distant's paper on mimicry; the illustration of "active mimicry" forming the subject of this section. Among many instructive examples, we may call attention to one very curious case. During the last decade gardens in Hamburg have been extensively planted with the white-leaved variety of the maple, and the common white butterfly has now accustomed itself to select that shrub on which to settle. Had Hamburg been a *terra incognita*, observes the author, there is little doubt that this practice would have been recorded as a striking instance of passive mimicry. Although not coming under the head of mimicry, we may mention that an analogous change of habit is taking place among many of the Argentine birds, which formerly built on the ground, but, as planting increases, are beginning to nest in trees.

WE learn from the U.S. *Monthly Weather Review* for September last, that the important international cloud work of the Weather Bureau, on which Prof. F. H. Bigelow has been engaged for several years, is now completed, and will be published in the annual report of that department for 1898-99. It will be remembered that about the middle of the year 1896 several meteorological services co-operated in taking a series of simultaneous observations on the height and motion of the ten standard types of clouds which have been defined by the International Cloud Committee, and that the observations were continued for at least a year. Those undertaken by the Weather Bureau were divided into two classes: (1) Those made by means of two theodolites placed at the end of a long base-line. These give the absolute height, velocity, and direction of motion of individual clouds at Washington. (2) Those made with nephoscopes at fourteen stations over the districts east of the Rocky Mountains, giving the relative velocity and direction of motion. The discussion of the data will show the distribution and average height of each type of cloud for every month, and the depth of the zone or horizontal belt in which each type may occur. A very important subject of investigation has been the determination of the direction and velocities of the horizontal motions of the air in each of the eight principal levels, on all sides of the areas of high and low barometric pressures as they move over the United States. This gives definite information regarding storm components, and will enable us to look more closely into the various theories of cyclones and anti-cyclones; it is stated that an attempt to interpret the analytical equations of motion has led to a different idea of the circulation in storms from that commonly taught by meteorologists.

SEVERAL drawings and reproductions of photographs of "the old moon in the young one's arms" are given in the *Bulletin* of the French Astronomical Society for December, 1899, with an article upon the subject of earth-shine, or *la lumière cendrée* as it is termed in France. Curious views have been held as to the reason why the whole dusky ball of



our satellite can be seen near the time of new moon. Posidonius thought that the moon was a diaphanous body, and that the rays of the sun passing through it caused the dull appearance observed. Tycho Brahe suggested that the appearance was produced by the illumination of the moon by Venus, and it was left to Leonard de Vinci to discover the real cause, namely, the reflection by the moon of sunlight reflected from the earth. The accompanying illustration of the phenomenon is from a photograph obtained by M. F. Quénisset.

APPENDIX III. to the Kew *Bulletin of Useful Information* for 1899 consists of a directory of the staffs of the Botanical Departments in these islands, in the colonies, and in India.

THE discovery of several lines in the infra-red spectrum of argon or of some associated gas is announced by Messrs. R. Nasini, F. Anderlini, and R. Salvadori in the *Atti dei Lincei*, viii. (2) 10. The spectrum, of which a photograph is given, was obtained from the residual gas of one of the fumaroli of

Vesuvius, but as it is stated to be perfectly identical in this region with that of argon obtained from air, and this again with the spectra of gases from other fumaroli of Vesuvius, from the rocks in the proximity of the crater, from the Grotta del Cane, from the Acque Albule of Tivoli, from the Bulicame del Viterbo, and from the carbon dioxide emanations of Pergine in Tuscany, the authors think that these lines belong to argon or to some gas accompanying argon in the air. The wave-lengths of the new lines are estimated by exterpolation to be 798, 803, 814, 832, 845, and 857·5, and Signor Anderlini has been able to see the first three lines in the Grotta del Cane gas. It is claimed that the lines in question have not been observed by Crookes, Kayser, Eder, Valenta and others.

IN the *Agricultural Gazette of New South Wales* for September, 1899, are several papers of more than local interest; especially one on the timber trade of New South Wales, by R. Dalrymple-Hay; protective inoculation against anthrax, by Dr. F. Tidswell, and entomological notes for 1898, by W. Froggatt. The last is illustrated by several excellent plates of insects destructive to timber.

WE have received *Bulletin* 175 (July, 1899) of the Michigan State Agricultural College Experiment Station (Entomological Department), edited by Messrs. Barrows and Pettit, and containing notes on about twenty species of insects observed during 1898, including a new moth destructive to peach, *Depressaria persicaeella*, Murtfeldt. The species now dealt with are different from those described in previous reports, and it is intended that future reports shall give a further selection, until all the more interesting or destructive insects of the State have been discussed. The greater part of the figures in this report are original.

WE are glad to notice that the first number of the second series of *The Library* contains a short section dealing with the progress of science, and some helpful notes for librarians on scientific works recently published. The selection of books is by no means complete, nor is it as representative as could be wished, but there seems no reason why this very useful part of an exceptionally interesting magazine should not be developed in future numbers. An excellent photogravure of Dr. Richard Garnett forms a suitable frontispiece to this first number.

DR. J. SANDERSON CHRISTISON'S little book "Crime and Criminals" has reached a second edition. It has been enlarged by the addition of an appendix containing analyses of the "Luetgert" case, which caused so great an excitement in America, and other noted crimes. The book is almost entirely made up of a series of articles on "Jail Types" which originally appeared in the *Chicago Tribune*. The photographs of actual criminals illustrating the volume will be of interest to students of criminology.

THE current number of the *Berichte* contains an important contribution by Dr. R. Scholl to the theory of the constitution of the fulminates. Of the numerous formulæ put forward since the first attempt of Kekulé, the simplest is that proposed by Scholl, and afterwards taken up by Nef, in connection with the views of the latter on divalent carbon, namely, that fulminic acid is carbyloxim, C : N.OH. The fact discovered by Nef, that the mercury salt of nitromethane on standing is partially converted, with loss of water, into mercury fulminate, is in good agreement with the above simple constitution. Further experimental support to this view is now given by Dr. Scholl in the present preliminary note, in which he aims at transferring the oximido group to a stable hydrocarbon radical. Silver fulminate and benzene react together in presence of aluminium chloride, forming benzaldoxim. The conditions necessary for securing good yields require very careful attention, and differ considerably from those generally favourable to the Friedel and Crafts reaction. Thus, with dry materials and freshly prepared aluminium chloride the yield was very bad; but the use of a commercial chloride gave good results. It was then found that the presence of a certain amount of moisture was necessary to obtain good yields, the highest being obtained when a mixture of pure, freshly prepared $AlCl_3$ and crystallised $AlCl_3.6H_2O$ was employed. These results are thus of interest from two points of view, the Friedel and Crafts reaction and the constitution of the fulminates.

THE additions to the Zoological Society's Gardens during the past week include a Black-backed Jackal (*Canis mesomelas*) from South Africa, presented by Mr. J. E. Matcham; a Mozambique Monkey (*Cercopithecus pygerythrus*) from East Africa, a Suricate (*Suricata tetradactyla*) from South Africa, two —— Chelodines (*Chelodina*, sp. inc.) from Australia, three Speckled Terrapins (*Clemmys guttata*) from North America, two Black-headed Terrapins (*Damonia reevesi unicolor*) from China, deposited.

OUR ASTRONOMICAL COLUMN.

HOLMES' COMET (1899 II.).—M. H. J. Zwiers gives a new ephemeris for this comet in the *Astronomische Nachrichten*, No. 3610. The object is getting so faint, however, that an abridgement for every fourth day only is given here.

Ephemeris for 12*h. Greenwich Mean Time.*

1899.	R.A.	Decl.
	h. m. s.	° ′ ″
Jan. 4	... 2 10 23·50	... +41 52 40·2
8	... 12 59·30	... 41 25 46·8
12	... 15 58·86	... 41 0 58·5
16	... 19 20·23	... 40 38 16·2
20	... 23 1·71	... 40 17 38·4
24	... 27 1·76	... 39 59 2·0
28	... 31 19·04	... 39 42 23·0
Feb. 1	... 2 35 52·32	... +39 27 36·6

ORBIT OF EROS.—Signor E. Millosevich, of Rome, has communicated to the *Astronomische Nachrichten*, No. 3609, an ephemeris for facilitating observations of the minor planet Eros during the coming opposition at the end of the present year. The ephemeris extends over the period 1900 September 1–1901 January 31, the positions being computed from the following elements :—

Elements for Epoch 1900 *October* 31·5 *Berlin Mean Time.*

$M = 304\ 23\ 59''.7$
$\pi = 121\ 9\ 22''.0$
$\omega = 177\ 38\ 41''.6$
$\Omega = 303\ 30\ 40''.4$
$i = 10\ 49\ 38\ 9$
$\varphi = 12\ 52\ 48\ 2$
$\mu = 2015''.12740$ (period 643·14d.)
$\log a = 0.1638027$

THE SOLAR PARALLAX.—In *Comptes rendus* (vol. 129, pp. 986–993), M. Bouquet de la Grye furnishes the result of his discussion of the facts obtained by the various French expeditions sent out to observe the Transit of Venus in 1882. The reports hitherto published of the expedition have only dealt with the form of the planet's disc and the question of photography. The calculations of the solar parallax from the times of contact of the planet with the sun's limb have occupied several years. The author states that the external contacts are influenced by the size of the objectives of the observing telescopes, but the internal contacts do not show any such connection. Using Halley's method, and combining the observations from the several stations in all possible groups, he finds that :—

From observations with large telescopes $p = 8''.7996$.
,, ,, ,, small ,, $p = 8''.8068$.

and gives *mean parallax* $= 8''.80$ from the visual observations of French parties. A full discussion of the measures of the photographic records obtained will be presented shortly.